

**WHAT IS CLAIMED IS:**

- 1 1. An etchant composition for etching molybdenum, comprising:  
2 5 to 20 % by weight of hydrogen peroxide ( $H_2O_2$ );  
3 75 to 94% by weight of water; and  
4 an additive, including a pH controlling agent.
- 1 2. The etchant composition of claim 1, wherein the additive including the pH controlling  
2 agent is selected from a group consisting of ammonium sulfate, ammonium nitrate, sodium  
3 dihydrogen citrate/disodium hydrogen citrate, disodium hydrogen phosphate/trisodium citrate,  
4 or ammonium acetate.
- 1 3. The etchant composition of claim 1, wherein the additive further comprises a  
2 surfactant.
- 1 4. The etchant composition of claim 3, wherein the surfactant is a fluorine-based  
2 surfactant.
- 1 5. The etchant composition of claim 1, wherein the hydrogen peroxide is 8 to 18% by  
2 weight.
- 1 6. The etchant composition of claim 5, wherein the additive including the pH controlling  
2 agent is selected from a group consisting of ammonium sulfate, ammonium nitrate, sodium  
3 dihydrogen citrate/disodium hydrogen citrate, disodium hydrogen phosphate/trisodium citrate,

4 or ammonium acetate.

1 7. A method of etching molybdenum on a substrate, comprising:  
2 preparing a solution comprising 5 to 20 % by weight of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), 75  
3 to 94% by weight of water, and an additive, including a pH controlling agent; and  
4 applying the solution to the substrate.

1 8. The method of claim 7, wherein applying the solution to the substrate comprises  
2 spraying the solution onto the substrate.

1 9. The method of claim 7, wherein applying the solution to the substrate comprises  
2 immersing the substrate into the solution.

1 10. The method of claim 7, wherein the solution is applied to the substrate at a  
2 temperature of between 20°C to 50°C.

1 11. The method of claim 7, wherein the solution is applied to the substrate at a  
2 temperature of between 30°C to 45°C.

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